

A REVIEW OF THE STATUS OF *EUPITHECIA*
GOOSSENSIATA MAB. (THE LING PUG) AND
E. ABSINTHIATA C1. (THE WORMWOOD PUG)
(LEP.: GEOMETRIDAE)

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Introduction

Whilst reviewing the British Pugs, I recently re-examined *Eupithecia goossensiata* Mab. and *Eupithecia absinthiata* Clerck. These two moths are usually considered to be separate species though the distinction has always been dubious; indeed Pierce (1911) and Dietze (1913) classified them as one. Against a background of early and rare literature, this paper re-examines their classification.

Structural and morphological criteria for separation of adults

Adult *E. goossensiata* are usually distinguished from *absinthiata* by their slightly smaller size, greyer ground colour and more clearly defined markings (Meyrick 1928, South 1961, Anon. 1981 & Skinner 1984). Although these points may be valid for fresh specimens they are of little use when the insects are worn. Superficially the genitalia appear very similar. Slides of genitalia prepared from "good" specimens of each species from my own collection and Rothamsted Insect Survey light trap catches showed no consistent characters by which they could be separated, despite differences (some allegedly quite obvious) illustrated by previous authorities (Bleszynski 1965 & Anon. 1981). Although Skinner *et al.*, in the "*Identification Guide to the British Pugs*" state that there are no distinguishing structural features, differences are still illustrated in the figures of genitalia prepared by Agassiz & Dyke (Anon. 1981). Some slight natural variation exists in the male and female genitalia and in the male abdominal plates. This, along with variation in slide mounting techniques and possibly an unquestioning acceptance that the two are distinct species, probably led to these erroneous illustrations. Peterson (1909) suggests that they cannot be separated by means of genitalia.

Effects of foodplants on larval morphology

The two most significant differences between *goossensiata* and *absinthiata* are their foodplants and the ground colour of the larvae and it is these jointly that constitute the major part of the argument for separation as species. In the natural state *absinthiata* feeds on

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many of the *Compositae* while *goossensiata* feeds only on a few *Ericaceae*, normally *Calluna vulgaris* (Newman 1869, Anon. 1981, Skinner 1984), but also *Erica tetralix* and *E. cineria* (Tutt 1096, Meyrick 1928, Stokoe 1948, South 1961). The larvae themselves are quite different in colour — *absinthiata* ranging from yellowish green to ochreous brown with darker dorsal chevrons, *goossensiata* being purplish pink with similar, though slightly more distinct, chevrons (Meyrick 1928, Stokoe 1948, South 1961, Anon. 1981 & Skinner 1984).

If the larvae are fed on each other's foodplants, a colour change occurs (Reid, *pers. comm.*). *Goossensiata* larvae fed from hatching on *Senecio jacobaea* or *Solidago virgaurea* lose their purplish pink ground colour, becoming whitish brown with pale chevrons (see also Baker (1895). *Minutata* Hübn = *goossensiata* Mab.) while those of *absinthiata* reared on the flowers of *C. vulgaris* are slightly smaller and adopt a pinkish hue. Rearing experiments similar to these with comparable results were described by Karl Dietze (1913). Although Dietze's work "*Biologie der Eupitheciën*" is still considered to be one of the most important publications on the pugs, his convincing arguments that *absinthiata* and *goossensiata* are not distinct seem to have been forgotten.

Absinthiata larvae are extremely variable in colour, whereas those of *goossensiata* are not. Haggett (*pers comm.*) has suggested that this may show behaviour indicative of separate species, but it seems probable that as the former has such catholic tastes, this variation may again be the result of the photophagic effects of the chosen foodplant. In the wild any one species of plant will produce a dominant colour form of *absinthiata* larvae with only limited variation (*S. jacobaea* will produce yellowish while *Tanacetum vulgare* produces pinkish larvae (Freer 1892)). This is also evident in *Eupithecia centaureata* D. & S. in which, for example, *S. jacobaea* and *S. virgaurea* produce larvae which are yellowish or bluish green whereas *Pimpinella saxifraga* produces a form which is greenish or pinkish white (Newman 1869). As long ago as the end of the last century it was known that such photophagic effects existed (Tutt 1899) so it is surprising that the larval ground colour of *absinthiata* and *goossensiata* should still constitute such a major part of the argument for classifying them as separate species.

Effects of larval foodplants on adult morphology

The expression of colour dependent upon the larval foodplant appears, in the case of *absinthiata* and *goossensiata*, to continue through the pupal (there are no structural dissimilarities and the differences in colour may, again, be a result of the larval foodplant) and into the adult stage. Reid found that adults of *absinthiata* developing from larvae fed on *C. vulgaris* were slightly smaller

than the normal form with a much paler ground colour (approaching *goossensiata*). The *goossensiata* adults from *S. jacobaea* and *S. virgaurea* were slightly larger and of a richer brown than typical *Calluna*-fed individuals (approaching *absinthiata*).

It is interesting to note that pink (apparently *goossensiata*) larvae have been found on foodplants which would normally be associated with *absinthiata*. (*S. jacobaea* and *Artemisia vulgaris* (Haggett and Riley *pers. comm.*), *Scabiosa* (Meyrick 1928), *Succisa pratensis* (Stokoe 1948)) and *Achillea millefolium* (Baker 1895). It appears, however, that "true" *goossensiata* adults have rarely resulted from any larvae, no matter what colour, other than those fed on *Ericaceae* (Haggett, *pers. comm.*). This suggests that, in this case, the larval foodplant has an important influence on the colour and size of the adult moths.

Attempts at cross-breeding

The only known attempt to inter-breed these two pugs resulted in a mating but unfortunately the eggs did not hatch (Reid, *pers. comm.*). Further attempts to produce successful matings must be made in order to ascertain the fertility of the offspring from such a cross.

Conclusions

The specific status of *E. knautiata* Gregs. (the scabious pug) was challenged after its supposed discovery in 1894. Gregson (1894 and 1895), Harpur-Crewe (1894), Johnson (1895) and Bird (1895) give an account of the discussion. It is the opinion of modern-day entomologists that *knautiata* was merely a field scabious-feeding form of *absinthiata* (Anon. 1981). It is interesting to note that the arguments proposed in reaching this conclusion were very similar to those presented here to challenge the specific status of *goossensiata*. It is my opinion that, although *absinthiata* and *goossensiata* may, at present, be in the process of speciation and could be regarded as two ecospecies, they are not structurally or morphologically distinct enough to warrant specific status.

As *absinthiata* appears earlier (1759) in the nomenclature than *goossensiata* (1869) (Kloet & Hinks 1972), this name should be used to represent the species.

Status of *goossensiata*

Goossensiata and *absinthiata* have been caught consistently in more or less equal numbers and during the same months each year over several years in many of the Rothamsted Insect Survey light traps (e.g. Yarner Wood, Devon. Site No. 266, O.S. grid ref. SX 786

788). They have also been observed in the field in overlapping habitats (Skinner, *pers. comm.*). This illustrates conclusively that there are no allopatric or allochronic divisions between two. By definition, then, *goossensiata* should not be considered a subspecies (Mayr 1969), but, in my opinion, merely a heathland form of *absinthiata* whose morphological characteristics are dictated by the larval foodplant.

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NOTE: in an interesting paper (Fibiger, M. *Lepidoptera N. S.* III 307-311 (1980) and Kaaber, S. *Lepidoptera N. S.* IV 41-29 (1982)) the authors consider the status of the *Eupithecia* couples *absinthiata/goossensiata* and *innotata/fraxinata*. Their major conclusion on the former pair, based on morphology, genitalia examination and captive breeding is that *E. goossensiata* is but a race or subspecies of *absinthiata*. In Denmark *goossensiata* is widely distributed on sandy soil, whereas *absinthiata* is mainly restricted to woodland habitats on clay soil. PAS.

OCHTHERA SPP. (DIPT.: EPHYDRIDAE): A CORRECTION. — In 1983, *Ent. Rec.* 95: 154 I reported a specimen of the uncommon fly *Ochthera mantis* Deg. from Catfield Fen, Norfolk, remarking that I had no knowledge of its distribution. Since that was written, however, Dr. A. G. Irwin has published an important paper in which he distinguishes a third British species of the genus, *Ochthera manicata* F., and shows that all captures in E. Anglia known to him, centring on this small area of N. E. Norfolk, are referable to *O. manicata* (1985, *Ent. mon. Mag.* 121: 151-4). It therefore is no surprise that my Catfield specimen is now found to belong to the last-named species and not *O. mantis*; particularly as it has occurred at the same locality to both Dr. Irwin and also Dr. J. W. Ismay (Irwin, *l.c.*). *O. mantis* on the other hand, though thinly scattered over the British Isles, is not hitherto known from that region. — A. A. ALLEN.